

**IN THE CLAIMS:**

1. (Currently Amended) A process for ultrapurifying fumes or gases with total recovery of the resultant pollutants, ~~characterised by~~ comprising:

- subjecting a stream of pollutant-containing fumes or gases to a sprinkle wash by unpolluted water within a snow producer ~~(20)~~ and subjecting the water, during its passage, to rapid cooling to a temperature sufficient to transform it into snow flakes, which along their path collect the pollutants present in the stream of fumes or gases,
- discharging from said snow producer ~~(20)~~ said snow flakes which have reached the base thereof, and
- feeding ~~to a gasifier (56)~~ the resultant polluted water deriving from said snow flakes to a gasifier.

2. (Currently Amended) A process as claimed in claim 1, ~~characterised by~~ further comprising feeding an ascending stream of fumes or gases into said snow producer ~~(20)~~.

3. (Currently Amended) A process as claimed in claim 1, ~~characterised by~~ further comprising subjecting the stream of gases or fumes to the action of the snow flakes within said snow producer ~~(20)~~ along at least one portion of their path in co-current and along at least one portion of their path in counter-current.

4. (Currently Amended) A process as claimed in claim 1, ~~characterised by~~ further comprising using, for the wash, unpolluted water provided by fuel cells ~~(62)~~ fed with hydrogen produced by said gasifier ~~(56)~~.

5. (Currently Amended) A process as claimed in claim 1, ~~characterised by~~ further comprising cooling the wash water to a temperature not greater than 0°C.

6. (Currently Amended) A process as claimed in claim 1, ~~characterised by~~ further comprising rapidly cooling the wash water by cooling the snow producer ~~(20)~~.

7. (Currently Amended) A process as claimed in claim 6, ~~characterised by~~ further comprising cooling said snow producer ~~(20)~~ with a stream of cold fluid circulating externally along the walls of the snow producer.

8. (Currently Amended) A process as claimed in claim 1, ~~characterised by~~ further comprising rapidly cooling said unpolluted water with a stream of cold gas injected into said snow producer ~~(20)~~.

9. (Currently Amended) A process as claimed in claim ~~claims 4 and 7~~, ~~characterised by~~ further comprising cooling said snow producer ~~(20)~~ with ~~the~~ oxygen used as combustion support in the gasifier ~~(56)~~.

10. (Currently Amended) A process as claimed in claim  
~~claims 7 and/or 8~~, ~~characterised by~~ further comprising  
rapidly cooling the wash water with a stream of carbon  
dioxide.

11. (Currently Amended) A process as claimed in claim  
~~claims 7 and/or 8~~, ~~characterised by~~ further comprising  
rapidly cooling the wash water with a stream of nitrogen.

12. (Currently Amended) A process as claimed in claim 1,  
~~characterised by~~ further comprising passing the stream of  
fumes or gases, already subjected to the action of the snow  
flakes, through dry activated carbon.

13. (Currently Amended) A process as claimed in claim 12,  
~~characterised by~~ further comprising drying the activated  
carbon with heat obtained from a thermal destruction plant  
(56).

14. (Currently Amended) A process as claimed in claim 12,  
~~characterised by~~ further comprising drying the activated  
carbon with heat generated by the plant which produces the  
stream of fumes or gases to be purified.

15. (Currently Amended) A process as claimed in claim 12  
~~claims 13 and/or 14~~, ~~characterised by~~ further comprising  
feeding to a gasifier (56) the resultant polluted water  
obtained by drying the activated carbon.

16. (Currently Amended) A process as claimed in claim 12, ~~characterised by~~ further comprising feeding the spent activated carbon to a thermal destruction plant ~~(56)~~.

17. (Currently Amended) A process as claimed in claim 1, ~~characterised in that~~ further comprising subjecting the stream of gases or fumes to washing before subjecting the stream of gases or fumes to the action of the snow flakes ~~it is subjected to washing~~, after which the resultant polluted water is fed to the gasifier ~~(56)~~.

18. (Currently Amended) A process as claimed in claim 17, ~~characterised by~~ further comprising washing the stream of fumes or gases by striking said stream with a water jet at high speed.

19. (Currently Amended) A process as claimed in claim 18, ~~characterised by~~ further comprising washing the stream of fumes or gases with a water jet forming an angle less than 90° to the direction of said stream of fumes or gases.

20. (Currently Amended) A process as claimed in claim 18, ~~characterised by~~ further comprising impressing high speed onto the water jet by making it fall from above onto a plate ~~(4)~~ rotating about a vertical axis.

21. (Currently Amended) A process as claimed in claim 17, ~~characterised by~~ further comprising washing the stream of fumes or gases with water at a temperature of about 4°C.

22. (Currently Amended) A process as claimed in claim 21, ~~characterised by~~ further comprising obtaining the wash water at a temperature of about 4°C by cooling with cold gas.

23. (Currently Amended) A process as claimed in claim 21, ~~characterised by~~ further comprising obtaining the wash water at a temperature of about 4°C by cooling with gas from the gasifier ~~(56)~~.

24. (Currently Amended) A process as claimed in claim 22, ~~characterised by~~ further comprising cooling the wash water with carbon dioxide.

25. (Currently Amended) A process as claimed in claim 22, ~~characterised by~~ further comprising cooling the wash water with nitrogen.

26. (Currently Amended) A process as claimed in claim 22, ~~characterised by~~ further comprising cooling the wash water with oxygen.

27. (Currently Amended) A process as claimed in claim 17, ~~characterised by~~ further comprising washing the stream of fumes or gases in a washer ~~(2)~~ having at least one wall grazed by said stream.

28. (Currently Amended) A process as claimed in claim 17 ~~one or more of claims 1, 15 and 17, characterised by further~~

comprising feeding the polluted discharge waters water to a purification plant ~~(16)~~ before feeding ~~them~~ to the gasifier ~~(56)~~.

29. Cancelled

30. (Currently Amended) A process as claimed in claim 28 ~~claims 28 and 29, characterised by further comprising~~ condensing the steam generated by the purification plant ~~(16)~~ by means of liquid CO<sub>2</sub> produced by the gasifier ~~(56)~~ to obtain ~~in this manner~~ water with which the washer ~~(2)~~ is fed.

31. (Currently Amended) A process as claimed in claim 1 29, ~~characterised by further comprising~~ using the hydrogen produced by the gasifier ~~(56)~~ to feed fuel cells ~~(61)~~, from which unpolluted water is obtained to feed the snow producer ~~(20)~~.

32. (Currently Amended) A plant for ~~implementing the process claimed in one or more of claims from 1 to 31,~~ characterised by ultrapurifying fumes or gases with total recovery of the resultant pollutants comprising:

- a snow producer ~~(20)~~ fed with the stream of fumes or gases to be purified and also fed with unpolluted water,
- cooling means ~~(34)~~ associated with said snow producer ~~(20)~~, to transform said water into snow flakes,

- at least one exit conduit ~~(36)~~ having an outlet, said exit conduit extending from said snow producer ~~(20)~~ for the stream of purified fumes or gases, and
- means (28) for connecting the base ~~(26)~~ of said snow producer ~~(20)~~ to a gasifier ~~(56)~~ for the resultant polluted water deriving from said snow flakes.

33. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the stream of fumes or gases within said snow producer ~~(20)~~ is ascending.

34. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the snow producer ~~(20)~~ is shaped to provide at least one portion through which the stream of fumes or gases takes a descending path and at least one portion through which it ascends.

35. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the base of said snow producer ~~(20)~~ is of conical shape.

36. (Currently Amended) A plant as claimed in claim 34, ~~characterised in that~~ wherein the snow producer ~~(20)~~ comprises at least two vessels ~~(22)~~ of substantially vertical extension, connected together to define a labyrinth path for the stream of fumes or gases.

37. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the walls of the snow producer ~~(20)~~ are heat insulated.

38. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the snow producer ~~(20)~~ is provided upperly with means ~~(32)~~ for the sprinkling delivery of said unpolluted water.

39. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the snow producer ~~(20)~~ is provided upperly with a plurality of nozzles ~~(34)~~ for delivering a stream of cold gas.

40. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the snow producer ~~(20)~~ is provided upperly with at least one perforated ring ~~(34)~~ fed with cold gas.

41. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the walls of the snow producer ~~(20)~~ are provided with at least one interspace for circulating a stream of cold gas.

42. (Currently Amended) A plant as claimed in claim 32, ~~characterised in that~~ wherein the outlet for the stream of fumes or gases from the snow producer ~~(20)~~ is connected via a conduit ~~(36)~~ to an activated carbon filter ~~(38)~~.



43. (Currently Amended) A plant as claimed in claim 42, ~~characterised in that~~ wherein the characteristics of said conduit ~~(36)~~ are chosen to enable the stream of fumes or gases to be heated as it flows therethrough.

44. (Currently Amended) A plant as claimed in claim 42, ~~characterised in that~~ wherein said conduit ~~(36)~~ is provided with heating means.

45. (Currently Amended) A plant as claimed in claim 42, ~~characterised in that~~ wherein the a dryer ~~(44)~~ for regenerating ~~said~~ activated carbon is associated with the activated carbon filter ~~(36)~~, together with a conveyor line ~~(50)~~ for said carbon regenerated within said filter ~~(38)~~.

46. (Currently Amended) A plant as claimed in claim 45, ~~characterised in that~~ wherein said dryer ~~(44)~~ is connected ~~provided with means (48) for its connection~~ to said gasifier ~~(56)~~.

47. (Currently Amended) A plant as claimed in claim 45, ~~characterised in that~~ wherein said dryer ~~(44)~~ is connected to a thermal destruction plant ~~(56)~~ for providing the heat necessary for the dryer operation.

48. (Currently Amended) A plant as claimed in claim 32, ~~characterised by~~ further comprising a washer ~~(2)~~ provided upstream of said snow producer ~~(20)~~ for preliminary treatment of the stream of fumes or gases to be purified.

49. (Currently Amended) A plant as claimed in claim 48, ~~characterised in that~~ wherein said washer (2) consists of a circular vessel provided internally with a rotating plate (4), the edge of the rotating plate and ~~which defines with~~ the wall of said vessel define an annular passage for the mixture of said fumes or gases fed into said vessel, with the wash water, the wash water ~~which is~~ made to fall from the top of said vessel onto said rotating plate (4).

50. (Currently Amended) A plant as claimed in claim 49, ~~characterised in that~~ wherein the rotating plate (4) presents a slight upwardly facing concavity.

51. (Currently Amended) A plant as claimed in claim 49, ~~characterised in that~~ wherein said vessel is of double conical form, with the central part of major diameter positioned at the height of said rotating plate (4).

52. (Currently Amended) A plant as claimed in claim ~~48~~ 32, ~~characterised in that~~ wherein said washer (2) is connected to said gasifier (56) via a conduit (14).

53. (Currently Amended) A plant as claimed in claim 35 ~~one or more of claims 35, 46 and 52~~, ~~characterised by~~ further comprising a purifier (16) fed with the discharge waters and connected to said gasifier (56).

54. (Currently Amended) A plant as claimed in claim 53, ~~characterised in that~~ wherein said purifier ~~(16)~~ comprises an evaporator with an exit for steam and another exit for resultant polluted water, which feeds said gasifier ~~(56)~~.

55. (Currently Amended) A plant as claimed in claim 53, ~~characterised by further~~ comprising a heat exchanger having a cooling circuit and a cooled circuit ~~(58)~~, ~~of which~~ the cooling circuit ~~is~~ fed with CO<sub>2</sub> originating from said gasifier ~~(56)~~ and is connected to said snow producer ~~(20)~~, the cooled circuit being fed with steam originating from said purifier ~~purification plant~~ ~~(16)~~ and being connected to said washer ~~(2)~~.

56. (Currently Amended) A plant as claimed in claim 32, ~~characterised by further~~ comprising a fuel cell system ~~(62)~~ ~~which is~~ fed with hydrogen from said gasifier ~~(56)~~ and which feeds said snow producer ~~(20)~~ with unpolluted water.

57. (Currently Amended) A plant as claimed in claim 45, ~~characterised in that~~ wherein the gasifier ~~(56)~~ is connected to the dryer ~~(44)~~ to provide the heat necessary for operating ~~this latter~~ the dryer.